

Application Serial No. 10/044,516
Date March 22, 2004
Reply to Office Action dated January 20, 2004

Page 2 of 7

Listing of the Claims:

1. (Currently Amended) A carburizing method for carrying out carburization in an atmosphere gas containing ~~not more than 30%~~ less than 20% by volume of carbon monoxide under a pressure of 13 to 4,000 Pa, wherein the carburization is carried out while analyzing the composition of the atmosphere gas by measuring a thermal conductivity and adjusting at least one of temperature, pressure, and composition of the atmosphere gas according to the analysis result.

2. (Cancelled).

3. (Cancelled)

4. (Cancelled).

5. (Currently Amended) A carburizing apparatus for carrying out carburization in an atmosphere gas containing ~~not more than 30%~~ less than 20% by volume of carbon monoxide under a pressure of 13 to 4,000 Pa, wherein the carburizing apparatus comprises a carburizing chamber for housing an object to be treated;

gas analysis means at least having an instrument for measuring a thermal conductivity for analyzing a composition of the atmosphere gas in said carburizing chamber during carburization;

at least one of temperature adjustment means for changing a temperature inside of said carburizing chamber according to an analysis result by said gas analysis means;

pressure adjustment means for changing a pressure inside of said carburizing chamber according to the analysis result by said gas analysis means;

atmosphere gas composition adjustment means for changing the composition of said atmosphere gas inside of said carburizing chamber according to the analysis result by said gas analysis means;

and an information display apparatus for displaying information of the analysis results according to the analysis results of said gas analysis means.

Application Serial No. 10/044,516
Date March 22, 2004
Reply to Office Action dated January 20, 2004

Page 3 of 7

6. (Cancelled).

7. (Cancelled).

8. (Cancelled).

9. (New) A carburizing apparatus comprising:
a carburizing chamber for housing an object to be treated;
said chamber maintained to a pressure of 13 to 4000 Pa during
carburization and having an atmosphere gas of less than 20% by volume of carbon
monoxide;

means for maintaining the atmosphere gas within the chamber at the
less than 20% by volume of carbon monoxide;

gas analysis means having an instrument for measuring a thermal
conductivity for analyzing a composition of the atmosphere gas in the chamber
during carburization;

a temperature adjustment means for changing a temperature inside of
the chamber according to an analysis result by the gas analysis means;

pressure adjustment means for changing a pressure inside of said
carburizing chamber according to the analysis result by said gas analysis means;

atmosphere gas composition adjustment means for changing the
composition of said atmosphere gas inside of said carburizing chamber according to
the analysis result by said gas analysis means; and

an information display apparatus for displaying information of the
analysis results according to the analysis results of said gas analysis means.

10. (New) A carburizing method comprising the steps of:
housing an object in a carburizing chamber;
maintaining an atmosphere gas containing less than 20% by volume of
carbon monoxide under a pressure of 13 to 4,000 Pa in the carburizing chamber;
measuring a thermal conductivity of the atmosphere gas for analyzing
the composition of the atmosphere gas;

Application Serial No. 10/044,516

Date March 22, 2004

Page 4 of 7

Reply to Office Action dated January 20, 2004

using the measured thermal conductivity result for adjusting the composition of the atmosphere gas; and

using the measured thermal conductivity result for adjusting at least one of the temperature and pressure of the atmosphere gas.